

LAKWOOD/PLAZA CLEANERS
LONG-TERM MONITORING ROUND IV
MAY 27-28, 1992

by
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Environmental Investigations and Laboratory Services Program
Toxics, Compliance and Ground Water Investigations Section
Olympia, Washington 98504-7710

Water Body No. WA- 1115GW
(Segment No. 05-12-GW)

October 1992

ABSTRACT

Routine monitoring was conducted at Lakewood/Plaza Cleaners on May 27-28, 1992, in compliance with the Record of Decision (ROD). Ground water samples were collected from eight monitoring wells. Low levels of tetrachloroethylene, trichloroethylene and 1,2-dichloroethylene continue to be detected in most of the monitoring wells, with the exception of MW-20B. Tetrachloroethylene concentrations increased substantially in well MW-20B from 120 ppb in November 1991 to 940 ppb in May 1992. The May 1992 tetrachloroethylene concentrations are similar to those reported in sample rounds prior to November 1991.

OBJECTIVES

The Toxics Cleanup Program (TCP) requested that the Toxics, Compliance, and Ground Water Investigations Section conduct long-term monitoring of the ground water at the Lakewood/Plaza Cleaners Site on a semi-annual basis. Monitoring objectives are as follows:

1. Collect ground water quality data that can be used to evaluate the effectiveness of continued operation of wells H1 and H2 to contain and remove contaminated ground water from the aquifer.
2. Monitor ground water upgradient of the site annually to determine if contaminants are migrating toward H1 and H2 from McChord Air Force Base (MCAF).

SITE BACKGROUND

In 1981, tetrachloroethylene (PERC), trichloroethylene (TCE), and 1,2-dichloroethylene (1,2-DCE) were detected in two Lakewood Water District supply wells (wells H1 and H2), as shown on Figure 1. On-site disposal of waste solvents and sludges at Plaza Cleaners, located 800 feet north of the wells, was identified as the source of contamination. Site remediation consisted of removal of contaminated sludge and soils, soil-vapor extraction and installation of two air-stripping towers for wells H1 and H2.

Results from on-site monitoring wells between 1985 to 1990 showed that the pump and treat system had contained and reduced the level of ground water contamination (CH2M Hill, 1990). A 1986 concentration contour map showed a portion of the contaminated plume, located northwest of the site, was not being captured by remedial pumping (CH2M Hill, 1988). However, contaminant concentrations in the uncaptured plume were decreasing; possibly due to biodegradation, dispersion and/or dilution.

Upgradient monitoring wells were installed to detect possible contaminant migration from the adjacent McChord Air Force Base (MCAF). Previous studies (EPA, 1985) indicated potential contamination sources from MCAF are located within the long-term capture zone of wells H1 and H2. Possible contaminants from MCAF include hydrocarbons, pesticides, and heavy metals. Upgradient monitoring wells MW-19A and MW-40 are sampled annually and were not sampled this round.

Geology of the study area was defined in the Final Draft Remedial Investigation Report for Ponder's Corner, Washington (EPA, 1985) as consisting of four geologic units which are listed in order of increased depth; the Steilacoom Gravel, Vashon Till, Advance Outwash, and the Colvos Sands. The main units of interest are the Steilacoom Gravel, Vashon Till and Advance Outwash. The Steilacoom Gravel is found throughout most of the study area and ranges in thickness from 1 to 58 feet. This unit often contains perched water. At the site perched ground water flows to the northwest near wells H1 and H2, but to the south and southeast near the south end of Plaza Cleaners. The Vashon Till underlies the Steilacoom Gravel and ranges in thickness from 8 to 92 feet. Over most of the site the till (a mixture of clay, silt, sand and gravel) forms an aquitard separating the Steilacoom Gravel, above, from the Advance Outwash, below. The Advance Outwash is the primary aquifer for the area. The predominant horizontal flow in the Advance Outwash is west-northwest when production wells H1 and H2 are not in use. When in use, the wells create a large cone of depression. Previous studies showed that drawdowns occur in shallow monitoring wells drilled in the Steilacoom gravel when H1 and H2 are pumping (EPA, 1985). This indicates some hydraulic interconnection between the Steilacoom Gravel and the Advance Outwash.

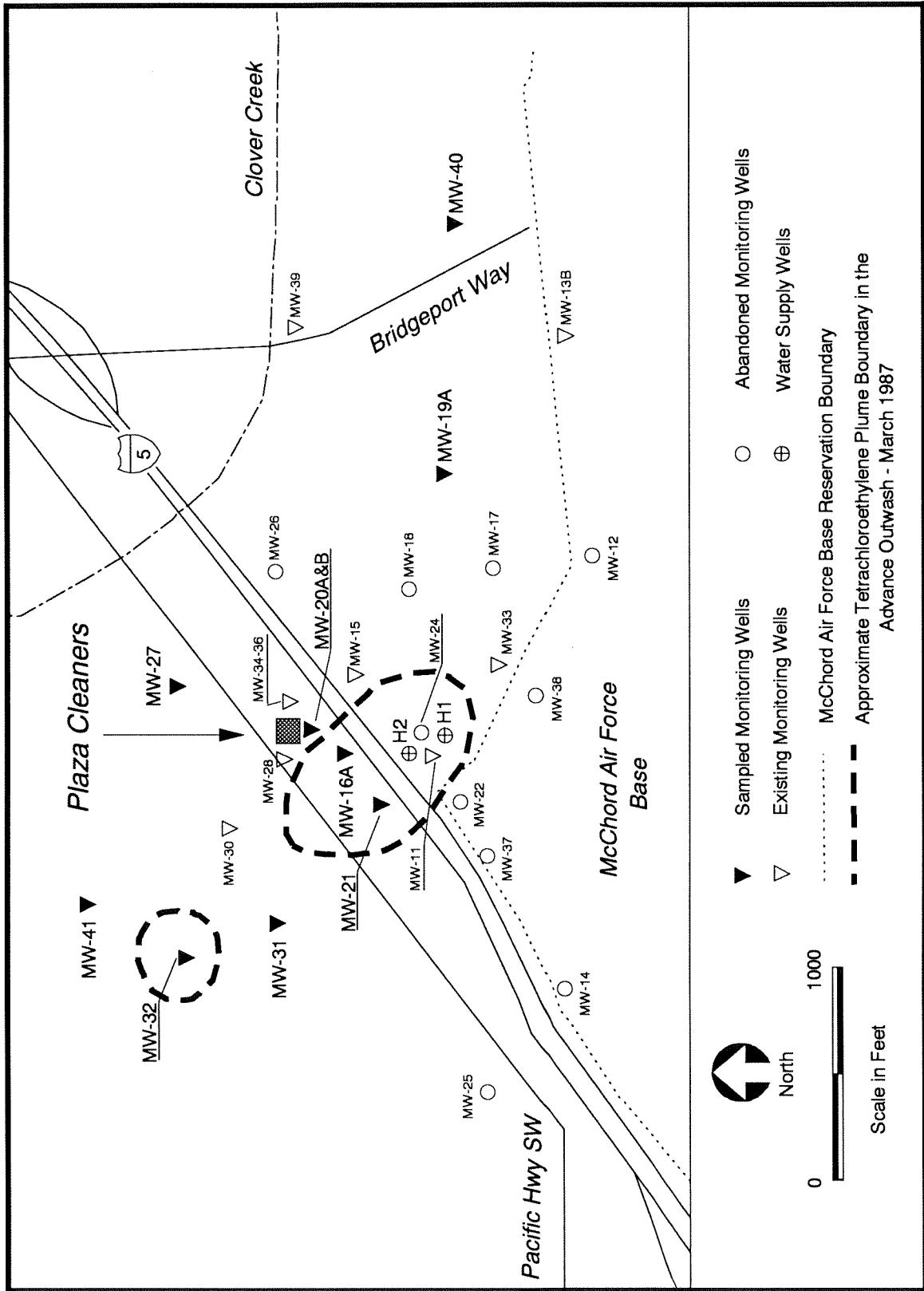


Figure 1: Well Location Map - Lakewood/Plaza Cleaners

METHODS

Ground Water Sampling

Samples were collected on May 27-28, 1992, from MW-16A, MW-20A, MW-20B, MW-21, MW-27, MW-31, MW-32, and MW-41 (Figure 2). Prior to sample collection, static water level measurements were obtained using an electronic water level indicator which was rinsed with deionized water after each use. All monitoring wells were purged until a minimum of three well volumes had been removed and pH, temperature, and specific conductance readings stabilized. Purge water was discharged to storm drains or to the ground near each monitoring well. All wells but one (MW-20B) were purged and sampled using dedicated bladder pumps. Well MW-20B was purged and sampled with a decontaminated teflon bailer.

Wells were sampled from the least to most contaminated. Samples collected for volatile organics were free of headspace and preserved with two drops of 1:1 hydrochloric acid. Volatile organic samples were analyzed using EPA SW 846 Method 8240 (EPA, 1986).

The bailer was pre-cleaned with a Liquinox® wash and sequential rinses of hot tap water, 10% nitric acid, distilled/deionized water, and pesticide-grade acetone. After cleaning, the bailer was air-dried and wrapped in aluminum foil. Chain-of-custody procedures were followed in accordance with Manchester Laboratory protocol (Huntamer and Hyre, 1991).

Quality Assurance Samples

Quality control samples collected in the field consisted of a blind duplicate, replicate, transfer blank, and transport blank. A blind duplicate sample, labeled MW-16B, was collected from well MW-16A. Duplicate samples are two sets of samples collected from a well simultaneously and submitted to the laboratory with different identification. A replicate sample, labeled MW-20A**, was collected from well MW-20A. Replicate samples are two sets of samples collected from a well at different times. A transfer blank was collected by pouring organic-free water through a decontaminated bailer. And a transport blank was carried unopened throughout the sampling event. In addition to quality control samples collected in the field, matrix spike, matrix spike duplicates and surrogate compound recoveries were performed in the laboratory.

Volatile organic analyses were performed by Manchester Laboratory. Dick Huntamer of the Manchester Laboratory conducted the quality assurance review, which has been included in Appendix A. Estimated concentrations of acetone, methylene chloride, 2-butanone, and toluene were detected in all of the method blanks at or near the detection limit. None of these compounds were detected in any of the field samples.

In general, the quality of the data is good. Duplicate samples collected at MW-16A provide an estimate of combined field and laboratory precision. The numeric comparison of duplicate results is expressed as the relative percent difference or RPD. RPDs are the ratio of the difference and the mean of the duplicate results expressed as a percentage. The RPDs for tetrachloroethylene (PERC) and 1,2-dichloroethylene (1,2-DCE) were 15% and 22%,

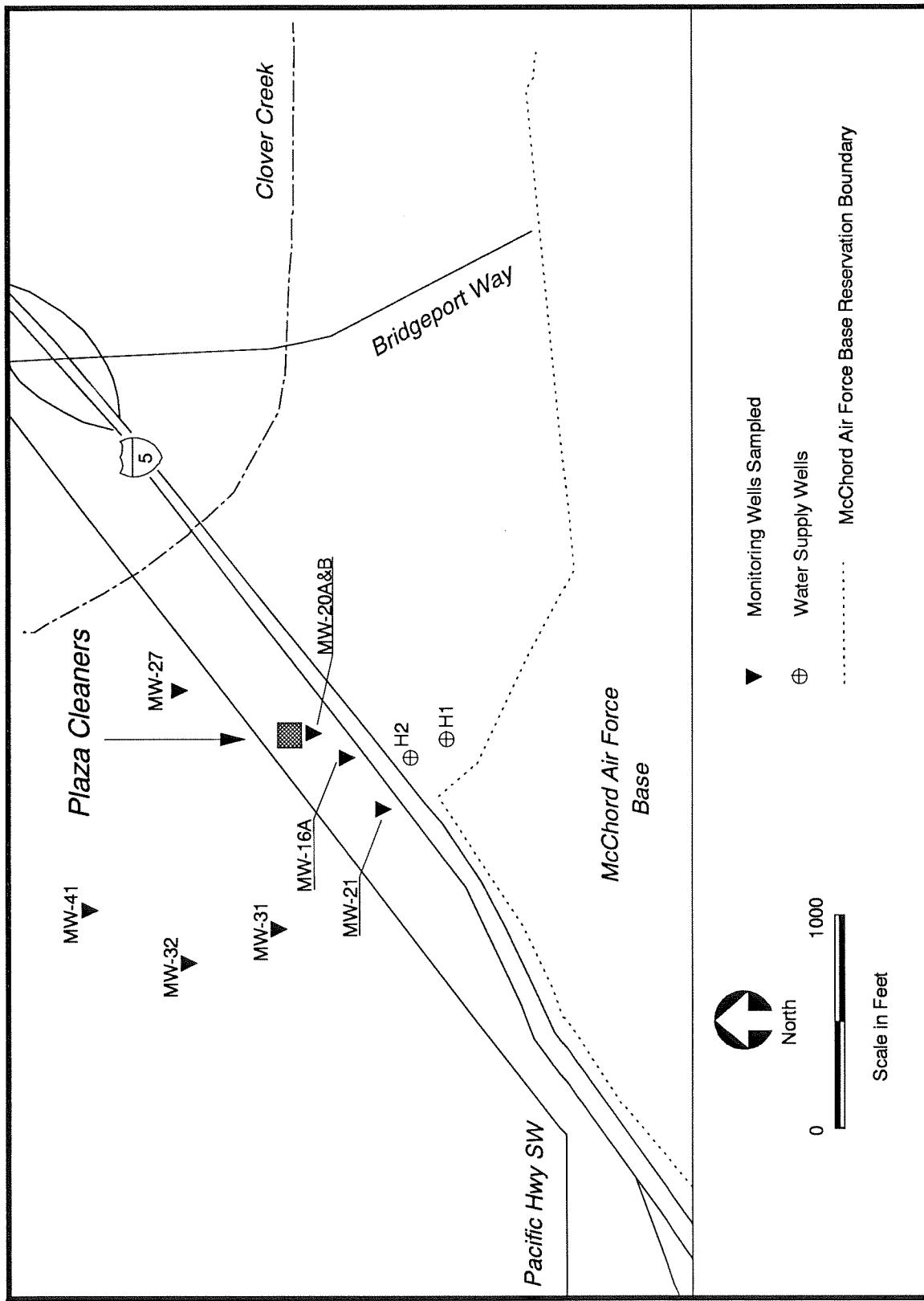


Figure 2: Lakewood/Plaza Cleaners Sample Locations for May 1992

respectively. Because these percentages are based on values near the quantitation limit, they are probably not representative of precision at higher concentrations. Matrix spike and spike duplicate recoveries for volatile organics are within the QC limits of $\pm 25\%$ for water sample analysis.

RESULTS

Field Observations

Table 1 lists field observation data including well depth, geologic unit, static water level, pH, specific conductance, temperature, and purged volume in order the wells were sampled. Depth to water ranged from 30.36 to 62.54 feet. Stabilized field measurements for pH, specific conductance and temperature ranged as follows: pH from 6.86 to 7.31 standard units, specific conductance from 165 to 436 umhos/cm and temperature from 11.8 to 14.3°C. Well MW-20A had a pH reading of 9.08 standard units, which is consistent with previous measurements. High pH readings in MW-20A are most likely related to well construction. Well MW-20B had a higher specific conductance reading (436 umhos/cm) than other wells. A higher specific conductance is expected for samples from the Vashon Till compared to samples from the Advance Outwash.

Analytical Results

Table 2 is a summary of analytical results for sample Round IV conducted on May 27-28, 1992. Tetrachloroethylene (PERC) and 1,2-dichloroethylene (1,2-DCE) were detected in most of the wells screened in the Advance Outwash. These compounds were detected in wells MW-16A, MW-20A, MW-21, MW-31, and MW-32 at concentrations at or near the quantitation limit. Maximum PERC (940 ppb), 1,2-DCE (32 ppb), and trichloroethylene (TCE, 13 ppb) concentrations were detected in well MW-20B, which is screened in the Vashon Till. Chloroform, 1,1,1-trichloroethane, 1,1-dichloroethane and trans-1,2-dichloroethene were also detected below the quantitation limit in well MW-20B.

Laboratory reporting sheets are presented in Appendix A. Data were managed using the ENVIS database software package.

DISCUSSION AND CONCLUSIONS

Table 3 shows PERC, TCE, and 1,2-DCE concentrations for January 1991 through May 1992. Well MW-20B continues to have the highest concentrations of any of the wells sampled. Historical maximum concentrations for PERC and TCE recorded in well MW-20B occurred in March 1985 at 4,856 ppb and 103 ppb respectively. PERC and TCE concentrations measured at the Lakewood site over the history of the project are presented in Appendix B. During this sample round concentrations of PERC, TCE and 1,2-DCE in MW-20B were 940 ppb, 13 ppb, and 32 ppb respectively. PERC concentration increased substantially from the November 1991 measurement of 120 ppb. The May 1992 concentrations are similar to those reported in sample rounds prior to November 1991. Well MW-20B is close to Plaza Cleaners, and is screened in the Vashon Till.

Table 1: Field Parameter Results for May 27-28, 1992

Monitoring Well	Total Depth From Top of PVC Casing As Measured	Geologic Unit Screened	Depth to Water	pH (st. units)	Specific Conductance (umhos/cm)	Temperature (°C)	Purge Volume (gallons)
MW-41	96.8	Advance Outwash	30.36	7.22	189	11.9	31
MW-27	96.4	Advance Outwash	++	6.86	181	12.9	20
MW-20A	97.3	Advance Outwash	35.75	9.08	210	13.6	31
MW-32	114.4	Advance Outwash	62.54	7.27	190	12.6	26
MW-31	91.5	Advance Outwash	++	7.04	179	11.8	32
MW-21	92.1	Advance Outwash	43.96	6.86	165	12.2	24
MW-16A	109	Advance Outwash	45.15	7.31	191	13.2	125
MW-20B	50.4	Vashon Till	38.57	6.92	436	14.3	6

++ = Water level was not measured due to obstruction in well.

Table 2: Summary of Analytes Detected in Samples Collected During May 27–28, 1992

Geologic Unit Screened	Vashon Till	Advance Outwash										Upgradient Wells
		MW-20B	MW-16A	MW-16B*	MW-20A	MW-20A**	MW-21	MW-27	MW-31	MW-32	MW-41	
Monitoring Well												NT
Volatile Organics: ($\mu\text{g/L}$)												
Tetrachloroethylene (PERC)	940	7	6	0.5 J	0.4 J	2	1.0 U	0.8 J	0.7 J	1.0 U	1.0 U	NT
Trichloroethylene (TCE)	13	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NT
1,2-Dichloroethylene (1,2-DCE)	32	1	0.8 J	1.0 U	1.0 U	0.6 J	1.0 U	1	1	1.0 U	1.0 U	NT
Chloroform	0.3 J	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NT
1,1,1-Trichloroethane	0.3 J	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NT
1,1-Dichloroethane	0.2 J	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NT
trans-1,2-Dichloroethene	0.5 J	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NT

* = Duplicate

** = Replicate

U = The analyte was not detected at or above the reported result.

J = The analyte was positively identified. The associated numerical result is an estimate.

NT = Not Tested

Table 3: Summary of Sampling Results from January 1991 to May 1992

Well Number	January 1991			May 1991			November 1991			May 1992		
	PERC	TCE	1,2-DCE	PERC	TCE	1,2-DCE	PERC	TCE	1,2-DCE	PERC	TCE	1,2-DCE
MW-16A	28	1 J	24 J	26	0.6 J	2	27 J	1.0 U	0.6 J	7	1.0 U	1
MW-20A	1.0 U	1.0 U	1.0 U	0.4 J	1.0 U	1.0 U	0.4 J	1.0 U	1.0 U	0.5 J	1.0 U	1.0 U
MW-20B	1100 D	18	33	752	16	30	120	2.6 J	6.7	940	13	32
MW-21	21 J	1.0 U	1 J	2	1.0 U	0.7 J	2.2 J	1.0 U	1.0 J	2	1.0 U	0.6 J
MW-27	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
MW-31	1 J	1.0 U	1.9 J	0.6 J	1.0 U	2	0.9 J	1.0 U	2.2 J	0.8 J	1.0 U	1
MW-32	1 J	1.0 U	1.1 J	1	1.0 U	2	0.6 J	1.0 U	0.6 J	0.7 J	1.0 U	1
MW-41	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
MW-19A	--	--	--	--	--	--	1.0 U	0.5 J	1.0 U	--	--	--
MW-40	1.0 U	1.0 U	1.0 U	--	--	--	1.0 U	1.0 U	1.0 U	--	--	--

U = The analyte was not detected at or above the reported result.

J = The analyte was positively identified. The associated numerical result is an estimate.

D = Analysis performed at secondary dilution.

-- = Not Tested

Low concentrations of PERC and 1,2-DCE were also detected in MW-16A with concentrations of 7 ppb and 1 ppb respectively. Concentrations in MW-16A continue to be higher in this well than those measured in MW-20A. Both wells are screened in the Advance Outwash below the contaminated Vashon Till, however, MW-16A is further from the source (See Figure 2). Higher contaminant concentrations in MW-16A are evidence that more permeable materials (lenses) in the overlying contaminated Vashon Till may be allowing downward migration of contaminants to the Advance Outwash.

Upgradient monitoring wells MW-19A and MW-40 were not sampled during this round. These wells will be sampled in November 1992.

REFERENCES

- CH2M Hill, 1988. Final Aquifer Cleanup Assessment Report Ponder's Corner, Washington. February 1988.
- , 1990. Sampling and Analysis Plan Remedial Action - Lakewood RA. April 1990.
- EPA, 1983. Methods for Chemical Analysis of Water and Wastes. Environmental Monitoring and Support Laboratory, Cincinnati, Ohio, EPA 600/4-79-020, 1983.
- , 1985. Final Draft Remedial Investigation Report - Ponder's Corner, Washington. EPA 112-0L22, 1985.
- , 1986. Test Methods for Evaluating Solid Waste, SW-846. Office of Emergency Response, Washington D.C.
- Huntamer, D. and J. Hyre, 1991. Manchester Environmental Laboratory - Laboratory Users Manual. July 1991.

APPENDIX A

Analytical Results
Lakewood/Plaza Cleaners
May 27-28, 1992

MANCHESTER ENVIRONMENTAL LABORATORY
7411 Beach Drive E , Port Orchard Washington 98366

CASE NARRATIVE

July 28, 1992

Subject: Lakewood/Plaza Cleaners

Samples: 92 - 228105 to -228116

Case No. DOE-075Y

Officer: Pam Marti

By: Dickey D. Huntamer
Organics Analysis Unit

VOLATILE ORGANIC ANALYSIS

ANALYTICAL METHODS:

Volatile organic compounds were analyzed using Manchester modification of the EPA SW 846 Method 8240 purge-trap procedure with capillary GC/MS analysis. Normal QA/QC procedures except for matrix spikes were performed on the samples.

BLANKS:

Low levels of the common laboratory solvents acetone, methylene chloride were detected in the laboratory blanks. The EPA five times rule was applied to all target compounds which were found in the blank. Compounds that were found in the sample and in the blank were considered real and not the result of contamination if the levels in the sample are greater than or equal to five times the amount of compounds in the associated method blank.

SURROGATES:

Surrogate recoveries were within acceptable limits for the three recommended surrogate compounds. The fourth surrogate, 1,2- Dichlorobenzene-d4, had lower recoveries than the recommended advisory limits of 78% to 123%. Since the other surrogates were acceptable no qualifiers were added to the sample data due to low recoveries of 1,2- Dichlorobenzene-d4.

HOLDING TIMES:

All of the water samples were analyzed within the recommended 14 day holding time.

MATRIX SPIKE AND MATRIX SPIKE DUPLICATE:

Matrix spikes recoveries were acceptable for all compounds.

SPECIAL ANALYTICAL PROBLEMS:

No analytical problems were encountered in the analysis. The data is acceptable for use.

DATA QUALIFIER CODES:

- U - The analyte was not detected at or above the reported value.
- J - The analyte was positively identified. The associated numerical value is an estimate.
- UJ - The analyte was not detected at or above the reported estimated result.
- REJ - The data are unusable for all purposes.
- EXP - The result is equal to the number before EXP times 10 to the power of the number after EXP. As an example 3EXP6 equals 3×10^6 .
- NAF - Not analyzed for.
- N - For organic analytes there is evidence the analyte is present in this sample.
- NJ - There is evidence that the analyte is present. The associated numerical result is an estimate.
- E - This qualifier is used when the concentration of the associated value exceeds the known calibration range.
- * - The analyte was present in the sample. (Visual Aid to locate detected compound on report sheet.)

4A
VOLATILE METHOD BLANK SUMMARY

Lab Name: MANCHESTER LAB Contract: D3P11

Lab Code: _____ Case No.: DOE-07 SAS No.: 1011 SDG No.: LAKEWO

Lab File ID: IBW2156 Lab Sample ID: LAB_BLANK

Date Analyzed: 06/04/92 Time Analyzed: 1037

Matrix: (soil/water) WATER Level: (low/med) LOW

Instrument ID: FINN

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS AND MSD:

EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	TIME ANALYZED
01 I92228105	SAMPLE	I228105	1135
02 I92228106	SAMPLE	I228106	1217
03 I92228107	SAMPLE	I228107	1300
04 I92228108	SAMPLE	I228108	1348
05 I92228109	SAMPLE	I228109	1432
06 I92228110	SAMPLE	I228110	1513
07 I92228111	SAMPLE	I228111	1552
08 IBW2156	LAB_BLANK	IBW2156	1037

COMMENTS: IBW2156 - 5MLS - BLANK - 6/4/92
PURGE AND TRAP

4A
VOLATILE METHOD BLANK SUMMARY

Lab Name: MANCHESTER LAB Contract: D3P11
Lab Code: _____ Case No.: DOE-07 SAS No.: 1011 SDG No.: LAKEWO
Lab File ID: IBW2157 Lab Sample ID: LAB_BLANK
Date Analyzed: 06/05/92 Time Analyzed: 1144
Matrix: (soil/water) WATER Level: (low/med) LOW
Instrument ID: FINN

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS AND MSD:

EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	TIME ANALYZED
01 I92228112	SAMPLE	I228112	1423
02 I92228113	SAMPLE	I228113	1506
03 I92228113A	SAMPLE_DILN	I228113A	1549
04 I92228115	SAMPLE	I228115	1254
05 I92228116	SAMPLE	I228116	1346
06 IBW2157	LAB_BLANK	IBW2157	1144

COMMENTS: IBW2157 - 5MLS - BLANK - 6/5/92
PURGE AND TRAP

4A
VOLATILE METHOD BLANK SUMMARY

Lab Name: MANCHESTER LAB Contract: D3P11

Lab Code: _____ Case No.: DOE-07 SAS No.: 1011 SDG No.: LAKEWQ

Lab File ID: IBW2160 Lab Sample ID: LAB_BLANK

Date Analyzed: 06/08/92 Time Analyzed: 1106

Matrix: (soil/water) WATER Level: (low/med) LOW

Instrument ID: FINN

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS AND MSD:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	TIME ANALYZED
01	I92228114	SAMPLE	I228114	1146
02	I92228114Y	MATRIX_SPIKE	I228114Y	1233
03	I92228114Z	MATRIX_SPKDUP	I228114Z	1320
04	IBW2160	LAB_BLANK	IBW2160	1106

COMMENTS: IBW2160 - 5MLS - BLANK - 6/8/92
PURGE AND TRAP

Project: DOE-075Y LAKEWOOD/PLAZA CLEANERS

Laboratory: Ecology, Manchester

Sample No: 92 228105

Description: MW-41

Begin Date: 9/2/05/27 :

	VOA - PP Scan (GCMS)	Water-Totals	VOA - PP Scan (GCMS)	Scan (GCMS)	Water-Totals	Result	Units
	Result	Units	Result	Continued	***	Result	Units
Carbon Tetrachloride	1U	ug/1	Bromobenzene			1U	ug/1
Acetone	5UJ	ug/1	Toluene			1U	ug/1
Chloroform	1U	ug/1	Chlorobenzene			1U	ug/1
Benzene	1U	ug/1	1,2,4-Trichlorobenzene			1U	ug/1
1,1,1-Trichloroethane	1U	ug/1	Dibromochloromethane			1U	ug/1
Bromomethane	1UJ	ug/1	Tetrachloroethene			1U	ug/1
Chloromethane	1UJ	ug/1	Sec-Butylbenzene			1U	ug/1
Dibromomethane	1U	ug/1	-1,3-Dichloropropane			1U	ug/1
Bromoform	1U	ug/1	Cis-1,2-Dichloroethene			1U	ug/1
Bromodichloromethane	1U	ug/1	trans-1,2-Dichloroethene			1U	ug/1
Chloroethane	1U	ug/1	1,3-Dichlorobenzene			1U	ug/1
Vinyl Chloride	1U	ug/1	1,1-Dichloropropene			1U	ug/1
Methylene Chloride	5U	ug/1	2,2-Dichloropropane			1U	ug/1
Carbon Disulfide	5UJ	ug/1	2-Hexanone			1U	ug/1
Bromoform	1U	ug/1	Ethane, 1,1,1,2-Tetrac+			1U	ug/1
Bromodichloromethane	1U	ug/1	Total Xylenes			1U	ug/1
1,1-Dichloroethane	1U	ug/1	cis-1,3-Dichloropropene			1U	ug/1
1,1-Dichlorofluoromethane	1U	ug/1	trans-1,3-Dichloroprop-			1U	ug/1
Trichlorofluoromethane	1U	ug/1	p-Bromofluorobenzene	99	% Recov		
Methane, Dichlorodiflu+	5U	ug/1	D4-1,2-Dichlorobenzene	54	% Recov		
1,2-Dichloropropane	1U	ug/1	d8-Toluene	97	% Recov		
2-Butanone	1U	ug/1	d4-1,2-Dichloroethane	105	% Recov		
1,1,2-Trichloroethane	1U	ug/1					
Ethene, trichloro-	1U	ug/1					
ETHANE, 1,1,2,2-TETRAC+	1U	ug/1					
1,2,3-Trichlorobenzene	1U	ug/1					
Hexachlorobutadiene	1U	ug/1					
Naphthalene	1U	ug/1					
2-Chlorotoluene	1U	ug/1					
1,2-Dichlorobenzene	1U	ug/1					
1,2,4-Trimethylbenzene	1U	ug/1					
1,2-Dibromo-3-chloropr+	5U	ug/1					
1,2,3-Trichloropropane	1U	ug/1					
Tert-Butylbenzene	1U	ug/1					
Isopropylbenzene (Cum+)	1U	ug/1					
p-Isopropyltoluene	1U	ug/1					
Ethylbenzene	1U	ug/1					
BENZENE, ETHENYL-(STYR+)	1U	ug/1					
BENZENE, PROPYL-	1U	ug/1					
Butylbenzene	1U	ug/1					
4-Chlorotoluene	1U	ug/1					
1,4-Dichlorobenzene	1U	ug/1					
1,2-Dibromoethane (EDB)	1U	ug/1					
1,2-Dichloroethane	1U	ug/1					
4-Methyl-2-Pentanone(M+	1U	ug/1					
1,3,5-Trimethylbenzene	1U	ug/1					

(Sample Complete)

Source: Well (Test/Observation)

Officer: PZM

Account: D3P11

Project: DOE-075Y LAKEWOOD/PLAZA CLEANERS

Laboratory: Ecology, Manchester

Sample No: 92 228106 Description: MW-27

Begin Date: 92/05/27 :

Source: Well (Test/Observation)

Officer: PZM Account: D3P11

	VOA - PP Scan (GCMS)	Water-Total	Result	Units	VOA - PP Scan (GCMS)	Water-Total	Result	Units
Carbon Tetrachloride	1U	ug/1	Bromobenzene	1U	ug/1			
Acetone	5UJ	ug/1	Toluene	1U	ug/1			
Chloroform	1U	ug/1	Chlorobenzene	1U	ug/1			
Benzene	1U	ug/1	1,2,4-Trichlorobenzene	1U	ug/1			
1,1,1-Trichloroethane	1U	ug/1	Dibromochloromethane	1U	ug/1			
Bromomethane	1UJ	ug/1	Tetrachloroethene	1U	ug/1			
Chloromethane	1UJ	ug/1	Sec-Butylbenzene	1U	ug/1			
Bromochloromethane	1U	ug/1	1,3-Dichloropropane	1U	ug/1			
Chloroethane	1U	ug/1	Cis-1,2-Dichloroethene	1U	ug/1			
Vinyl Chloride	1U	ug/1	trans-1,2-Dichloroethene+	1U	ug/1			
Methylene Chloride	5U	ug/1	1,3-Dichlorobenzene	1U	ug/1			
Carbon Disulfide	5UJ	ug/1	1,1-Dichloropropane	1U	ug/1			
Bromoform	1U	ug/1	2,2-Dichloropropane	1U	ug/1			
Bromodichloromethane	1U	ug/1	2-Hexanone	1U	ug/1			
1,1-Dichloroethane	1U	ug/1	Ethane, 1,1,1,2-Tetrac+	1U	ug/1			
1,1-Dichloroethene	1U	ug/1	Total Xylenes	1U	ug/1			
Trichlorofluoromethane	1U	ug/1	cis-1,3-Dichloropropene	1U	ug/1			
Methane, Dichlorodiflu+	5U	ug/1	trans-1,3-Dichloropropene	1U	ug/1			
1,2-Dichloropropane	1U	ug/1	p-Bromofluorobenzene	100	% Recov			
2-Butanone	5U	ug/1	D4-1,2-Dichlorobenzene	54	% Recov			
1,1,2-Trichloroethane	1U	ug/1	d8-Toluene	98	% Recov			
Ethane, trichloro-	1U	ug/1	d4-1,2-Dichloroethane	102	% Recov			
ETHANE, 1,1,2,2-TETRAC+	1U	ug/1						
1,2,3-Trichlorobutadiene	1U	ug/1						
Naphthalene	1U	ug/1						
2-Chlorotoluene	1U	ug/1						
1,2-Dichlorobenzene	1U	ug/1						
1,2,4-Trimethylbenzene	1U	ug/1						
1,2-Dibromo-3-chloropr+	5U	ug/1						
1,2,3-Trichloropropane	1U	ug/1						
Tert-Butylbenzene	1U	ug/1						
Isopropylbenzene (Cum+	1U	ug/1						
P-Isopropyltoluene	1U	ug/1						
Ethylbenzene	1U	ug/1						
BENZENE, ETHENYL-(STYR+	1U	ug/1						
BENZENE, PROPYL-	1U	ug/1						
Butylbenzene	1U	ug/1						
4-Chlorotoluene	1U	ug/1						
1,4-Dichlorobenzene (EDB)	1U	ug/1						
1,2-Dichloroethane	1U	ug/1						
1,2-Dichloroethane	1U	ug/1						
4-Methyl-2-Pentanone(M+	1U	ug/1						
1,3,5-Trimethylbenzene	1U	ug/1						

(Sample Complete)

Project: DOE-075Y LAKEWOOD/PLAZA GLEANERS

Officer: PZM Account: D3P11

Laboratory: Ecology, Manchester

Sample No: 92 228107 Description: MW-20A

Begin Date: 9/2/05/27 :

	VOA - PP Scan (GCMS)	Water-Totals	VOA - PP Scan (GCMS)	Water-Totals	
	Result	Units	*** Continued	Result	Units
Carbon Tetrachloride	1U	ug/l	Bromobenzene	1U	ug/l
Acetone	5U	ug/l	Toluene	1U	ug/l
Chloroform	1U	ug/l	Chlorobenzene	1U	ug/l
Benzene	1U	ug/l	1,2,4-Trichlorobenzene	1U	ug/l
1,1,1-Trichloroethane	1U	ug/l	Dibromochloromethane	1U	ug/l
Bromomethane	1U	ug/l	Tetrachloroethene	0.5J*	ug/l
Chloromethane	1U	ug/l	Sec-Butylbenzene	1U	ug/l
Dibromomethane	1U	ug/l	1,3-Dichloropropane	1U	ug/l
Bromoform	1U	ug/l	Cis-1,2-Dichloroethene	1U	ug/l
Bromodichloromethane	1U	ug/l	trans-1,2-Dichloroethene+	1U	ug/l
Chloroethane	1U	ug/l	1,3-Dichlorobenzene	1U	ug/l
Vinyl Chloride	5U	ug/l	1,1-Dichloropropane	1U	ug/l
Methylene Chloride	5U	ug/l	2,2-Dichloropropane	1U	ug/l
Carbon Disulfide	5U	ug/l	2-Hexanone	1U	ug/l
Bromoform	1U	ug/l	Ethane, 1,1,1,2-Tetrac+	1U	ug/l
Bromodichloromethane	1U	ug/l	Total Xylenes	1U	ug/l
1,1-Dichloroethane	1U	ug/l	cis-1,3-Dichloropropene	1U	ug/l
1,1-Dichloroethene	1U	ug/l	trans-1,3-Dichloroprop-	1U	ug/l
Trichlorofluoromethane	1U	ug/l	P-Bromofluorobenzene	101	% Recov
Methane, Dichlorodiflu+	5U	ug/l	D4-1,2-Dichlorobenzene	52	% Recov
1,2-Dichloropropane	1U	ug/l	d8-Toluene	104	% Recov
2-Butanone	5U	ug/l	d4-1,2-Dichloroethane	100	% Recov
1,1,2-Trichloroethane	1U	ug/l	Naphthalene		
Ethene, trichloro-	1U	ug/l	2-Chlorotoluene		
ETHANE, 1,1,2,2-TETRAC+	1U	ug/l	1,2-Dichlorobenzene		
1,2,3-Trichlorobenzene	1U	ug/l	1,2,4-Trimethylbenzene		
Hexachlorobutadiene	1U	ug/l	1,2-Dibromo-3-Chloropr+		
Naphthalene	1U	ug/l	1,2,3-Trichloropropane		
2-Chlorotoluene	1U	ug/l	Tert-Butylbenzene		
1,2-Dichlorobenzene	1U	ug/l	Isopropylbenzene (Cumene+)		
1,2,4-Trimethylbenzene	1U	ug/l	P-Isopropyltoluene		
1,2-Dibromo-3-Chloropr+	5U	ug/l	Ethylbenzene		
1,2,3-Trichloropropane	1U	ug/l	BENZENE, ETHENYL-(STYR+)		
Tert-Butylbenzene	1U	ug/l	BENZENE, PROPYL-		
Isopropylbenzene (Cumene+)	1U	ug/l	Butylbenzene		
P-Isopropyltoluene	1U	ug/l	4-Chlorotoluene		
Ethylbenzene	1U	ug/l	1,4-Dichlorobenzene		
BENZENE, ETHENYL-(STYR+)	1U	ug/l	1,2-Dibromoethane (EDB)		
BENZENE, PROPYL-	1U	ug/l	1,2-Dichloroethane		
Butylbenzene	1U	ug/l	4-Methyl-2-Pentanone (M+		
4-Chlorotoluene	1U	ug/l	1,3,5-Trimethylbenzene		

(Sample Complete)

Source: Well (Test/Observation)

Project: DOE-075Y LAKEWOOD/PLAZA CLEANERS

Laboratory: Ecology, Manchester

Sample No: 92 228108

Description: MW-32

Begin Date: 92/05/27 :

	VOA - PP Scan (GCMS)	Water-Totals	Result	Units	VOA - PP Scan (GCMS)	Water-Totals	Result	Units
Carbon Tetrachloride	1U	ug/l	Bromobenzene	1U	ug/l			
Acetone	5UJ	ug/l	Toluene	1U	ug/l			
Chloroform	1U	ug/l	Chlorobenzene	1U	ug/l			
Benzene	1U	ug/l	1,2,4-Trichlorobenzene	1U	ug/l			
1,1,1-Trichloroethane	1U	ug/l	Dibromochloromethane	1U	ug/l			
Bromomethane	1U	ug/l	Tetrachloroethene	1U	ug/l			
Chloromethane	1UJ	ug/l	0.7J*	ug/l				
Dibromomethane	1U	ug/l	Sec-Butylbenzene	1U	ug/l			
Bromo-chloromethane	1U	ug/l	1,3-Dichloropropane	1U	ug/l			
Chloroethane	1U	ug/l	Cis-1,2-Dichloroethene	1*	ug/l			
Vinyl Chloride	1U	ug/l	trans-1,2-Dichloroethene	1U	ug/l			
Methylene Chloride	5U	ug/l	1,3-Dichlorobenzene	1U	ug/l			
Carbon Disulfide	5UJ	ug/l	1,1,1-Dichloropropane	1U	ug/l			
Bromoform	1U	ug/l	2,2-Dichloropropane	1U	ug/l			
Bromodichloromethane	1U	ug/l	2-Hexanone	1U	ug/l			
1,1-Dichloroethane	1U	ug/l	Ethane, 1,1,1,2-Tetrac+	1U	ug/l			
1,1-Dichloroethene	1U	ug/l	Total Xylenes	1U	ug/l			
Trichlorofluoromethane	1U	ug/l	cis-1,3-Dichloropropene	1U	ug/l			
Methane, Dichlorodiflu-	5U	ug/l	trans-1,3-Dichloropropene	1U	ug/l			
1,2-Dichloropropane	1U	ug/l	p-Bromofluorobenzene	98	% Recov			
2-Butanone	5U	ug/l	D4-1,2-Dichlorobenzene	57	% Recov			
1,1,2-Trichloroethane	1U	ug/l	d8-Toluene	95	% Recov			
Ethene, trichloro-	1U	ug/l	d4-1,2-Dichloroethane	99	% Recov			
Ethane, 1,1,2,2-TETRAC+	1U	ug/l						
1,2,3-Trichlorobenzene	1U	ug/l						
Hexachlorobutadiene	1U	ug/l						
Naphthalene	1U	ug/l						
2-Chlorotoluene	1U	ug/l						
1,2-Dichlorobenzene	1U	ug/l						
1,2,4-Trimethylbenzene	1U	ug/l						
1,2-Dibromo-3-chloropr+	5U	ug/l						
1,2,3-Trichloropropane	1U	ug/l						
Tert-Butylbenzene	1U	ug/l						
Isopropylbenzene (Cum+	1U	ug/l						
P-Isopropyltoluene	1U	ug/l						
Ethylbenzene	1U	ug/l						
BENZENE, ETHENYL-(STYR+	1U	ug/l						
BENZENE, PROPYL-	1U	ug/l						
Butylbenzene	1U	ug/l						
4-Chlorotoluene	1U	ug/l						
1,4-Dichlorobenzene	1U	ug/l						
1,2-Dibromoethane (EDB)	1U	ug/l						
1,2-Dichloroethane	1U	ug/l						
4-Methyl-2-Pentanone (M+	1U	ug/l						
1,3,5-Trimethylbenzene	1U	ug/l						

(Sample Complete)

Source: Well (Test/Observation)

Officer: PZM

Account: D3P11

Washington State Department of Ecology
Sample/Project Analysis Results

Project: DOE-075Y LAKWOOD/PLAZA CLEANERS

Laboratory: Ecology, Manchester

Sample No: 92 228109

Description: MW-31

Begin Date: 9/05/27 :

	VOA - PP Scan (GCMS)	Water-Total	VOA - PP Scan (GCMS)	Water-Total	
	Result	Units	Result	Units	*** Continued ***
Carbon Tetrachloride	1U	ug/l	Bromobenzene	1U	ug/l
Acetone	5U	ug/l	Toluene	1U	ug/l
Chloroform	1U	ug/l	Chlorobenzene	1U	ug/l
Benzene	1U	ug/l	1,2,4-Trichlorobenzene	1U	ug/l
1,1,1-Trichloroethane	1U	ug/l	Dibromochloromethane	1U	ug/l
Bromomethane	1U	ug/l	Tetrachloroethene	0.8J*	ug/l
Chlormethane	1UJ	ug/l	Sec-Butylbenzene	1U	ug/l
Dibromochloromethane	1U	ug/l	1,3-Dichlorobenzene	1U	ug/l
Bromochloromethane	1U	ug/l	Cis-1,2-Dichloroethene	1*	ug/l
Chloroethane	1U	ug/l	trans-1,2-Dichloroethene+	1U	ug/l
Vinyl Chloride	1U	ug/l	1,3-Dichlorobenzene	1U	ug/l
Methylene Chloride	5U	ug/l	1,1-Dichloropropane	1U	ug/l
Carbon Disulfide	5UJ	ug/l	2,2-Dichloropropane	1U	ug/l
Bromoform	1U	ug/l	2-Hexanone	1U	ug/l
Bromodichloromethane	1U	ug/l	Ethane, 1,1,1,2-Tetrac+	1U	ug/l
1,1-Dichloroethane	1U	ug/l	Total Xylenes	1U	ug/l
1,1-Dichloroethene	1U	ug/l	cis-1,3-Dichloropropene	1U	ug/l
Trichlorofluoromethane	1U	ug/l	trans-1,3-Dichloropropene	1U	ug/l
Methane, Dichlorodiflu-	5U	ug/l	p-Bromofluorobenzene	98	% Recov
1,2-Dichloropropane	1U	ug/l	D4-1,2-Dichlorobenzene	56	% Recov
2-Butanone	5U	ug/l	d8-Toluene	101	% Recov
1,1,2-Trichloroethane	1U	ug/l	d4-1,2-Dichloroethane	99	% Recov
Ethene, trichloro-	1U	ug/l			
ETHANE, 1,1,2,2-TETRAC+	1U	ug/l			
1,2,3-Trichlorobenzene	1U	ug/l			
Hexachlorobutadiene	1U	ug/l			
Naphthalene	1U	ug/l			
2-Chlorotoluene	1U	ug/l			
1,2-Dichlorobenzene	1U	ug/l			
1,2,4-Trimethylbenzene	1U	ug/l			
1,2-Dibromo-3-chloroprop-	5U	ug/l			
1,2,3-Trichloropropane	1U	ug/l			
Tert-Butylbenzene	1U	ug/l			
Isopropylbenzene (Cum+	1U	ug/l			
P-Isopropyltoluene	1U	ug/l			
Ethylbenzene	1U	ug/l			
BENZENE, ETHENYL-(STYR+	1U	ug/l			
BENZENE, PROPYL-	1U	ug/l			
Butylbenzene	1U	ug/l			
4-Chlorotoluene	1U	ug/l			
1,4-Dichlorobenzene	1U	ug/l			
1,2-Dibromoethane (EDB)	1U	ug/l			
1,2-Dichloroethane	1U	ug/l			
4-Methyl-2-Pentanone (M+	1U	ug/l			
1,3,5-Trimethylbenzene	1U	ug/l			

Source: Well (Test/Observation)

Officer: PZM

Account: D3P11

Project: DOE-075Y LAKEWOOD/PLAZA CLEANERS

Laboratory: Ecology, Manchester

Sample No: 92 228110 Description: MW-21

Begin Date: 92/05/28 :

	VOA - PP Scan (GCMS)	Water-Total Result	Units	VOA - PP Scan (GCMS) *** Continued ***	Water-Total Result	Units
Carbon Tetrachloride	1U	ug/1		Bromobenzene	1U	ug/1
Acetone	5UJ	ug/1		Toluene	1U	ug/1
Chloroform	1U	ug/1		Chlorobenzene	1U	ug/1
Benzene	1U	ug/1		1,2,4-Trichlorobenzene	1U	ug/1
1,1,1-Trichloroethane	1U	ug/1		Dibromochloromethane	1U	ug/1
Bromomethane	1U	ug/1		Tetrachloroethene	2 *	ug/1
Chloromethane	1UJ	ug/1		Sec-Butylbenzene	1U	ug/1
Dibromomethane	1U	ug/1		1,3-Dichloropropane	1U	ug/1
Bromoform	1U	ug/1		Cis-1,2-Dichloroethene	0.6J*	ug/1
Chloroethane	1U	ug/1		trans-1,2-Dichloroethene+	1U	ug/1
Vinyl Chloride	1U	ug/1		1,3-Dichlorobenzene	1U	ug/1
Methylene Chloride	5U	ug/1		1,1-Dichloropropane	1U	ug/1
Carbon Disulfide	5UJ	ug/1		2,2-Dichloropropane	1U	ug/1
Bromodichloromethane	1U	ug/1		Ethane, 1,1,1,2-Tetrac+	1U	ug/1
1,1-Dichloroethane	1U	ug/1		Total Xylenes	1U	ug/1
1,1-Dichloroethene	1U	ug/1		cis-1,3-Dichloropropene	1U	ug/1
Trichlorofluoromethane	1U	ug/1		trans-1,3-Dichloropropene	1U	ug/1
Methane, Dichlorodiflu+	5U	ug/1		p-Bromofluorobenzene	100	% Recov
1,2-Dichloropropane	1U	ug/1		D4-1,2-Dichlorobenzene	47	% Recov
2-Butanone	5U	ug/1		d8-Toluene	97	% Recov
1,1,2-Trichloroethane	1U	ug/1		d4-1,2-Dichloroethane	101	% Recov
Ethene, trichloro-	1U	ug/1				
ETHANE, 1,1,2,2-TETRAC+	1U	ug/1				
1,2,3-Trichlorobenzene	1U	ug/1				
Naphthalorbutadiene	1U	ug/1				
Naphthalene	1U	ug/1				
2-Chlorotoluene	1U	ug/1				
1,2-Dichlorobenzene	1U	ug/1				
1,2,4-Trimethylbenzene	1U	ug/1				
1,2-Dibromo-3-chloropr+	5U	ug/1				
1,2,3-Trichloropropane	1U	ug/1				
Tert-Butylbenzene	1U	ug/1				
Isopropylbenzene (Cum+	1U	ug/1				
p-Isopropyltoluene	1U	ug/1				
Ethylbenzene	1U	ug/1				
BENZENE, ETHENYL-(STYR+	1U	ug/1				
BENZENE, PROPYL-	1U	ug/1				
Butylbenzene	1U	ug/1				
4-Chlorotoluene	1U	ug/1				
1,4-Dichlorobenzene	1U	ug/1				
1,2-Dibromoethane (EDB)	1U	ug/1				
1,2-Dichloroethane	1U	ug/1				
4-Methyl-2-Pentanone (M+	1U	ug/1				
1,3,5-Trimethylbenzene	1U	ug/1				

(Sample Complete)

Source: Well (Test/Observation)

Project: DOE-075Y LAKEWOOD/PLAZA CLEANERS

Officer: PZM Account: D3P11

Laboratory: Ecology, Manchester

Sample No: 92 228111 Description: MW-16A

Begin Date: 92/05/28 :

Source: Well (Test/Observation)

	VOA - PP Scan (GCMS)	Water-Total	Result	Units	VOA - PP Scan (GCMS)	Water-Total	Result	Units
					*** Continued	***		
Carbon Tetrachloride	1U	ug/l	Bromobenzene	1U	ug/l			
Acetone	1UJ	ug/l	Toluene	1U	ug/l			
Chloroform	1U	ug/l	Chlorobenzene	1U	ug/l			
Benzene	1U	ug/l	1,2,4-Trichlorobenzene	1U	ug/l			
1,1,1-Trichloroethane	1U	ug/l	Dibromoethane	1U	ug/l			
Bromomethane	1UJ	ug/l	Tetrachloroethene	7*	ug/l			
Chloromethane	1U	ug/l	Sec-Butylbenzene	1U	ug/l			
Dibromomethane	1U	ug/l	1,3-Dichloropropane	1U	ug/l			
Bromochloromethane	1U	ug/l	Cis-1,2-Dichloroethene	1*	ug/l			
Chloroethane	1U	ug/l	trans-1,2-Dichloroethene	1U	ug/l			
Vinyl Chloride	5U	ug/l	1,3-Dichlorobenzene	1U	ug/l			
Methylene Chloride	5UJ	ug/l	1,1-Dichloropropene	1U	ug/l			
Carbon Disulfide	1U	ug/l	2,2-Dichloropropane	1U	ug/l			
Bromoform	1U	ug/l	2-Hexanone	1U	ug/l			
Bromodichloromethane	1U	ug/l	Ethane, 1,1,1,2-Tetrac+	1U	ug/l			
1,1-Dichloroethane	1U	ug/l	Total Xylenes	1U	ug/l			
1,1-Dichloroethene	1U	ug/l	cis-1,3-Dichloropropene	1U	ug/l			
Trichlorofluoromethane	5U	ug/l	trans-1,3-Dichloropropene	1U	ug/l			
Methane, Dichlorodiflu+	1U	ug/l	p-Bromofluorobenzene	98	% Recov			
1,2-Dichloropropane	5U	ug/l	D4-1,2-Dichlorobenzene	52	% Recov			
2-Butanone	1U	ug/l	d8-Toluene	93	% Recov			
1,1,2-Trichloroethane	1U	ug/l	d4-1,2-Dichloroethane	98	% Recov			
Ethene, trichloro-	1U	ug/l						
ETHANE, 1,1,2,2-TETRAC+	1U	ug/l						
1,2,3-Trichlorobenzene	1U	ug/l						
Hexachlorobutadiene	1U	ug/l						
Naphthalene	1U	ug/l						
2-Chlorotoluene	1U	ug/l						
1,2-Dichlorobenzene	1U	ug/l						
1,2,4-Trimethylbenzene	1U	ug/l						
1,2-Dibromo-3-chloropr+	5U	ug/l						
1,2,3-Trichloropropane	1U	ug/l						
Tert-Butylbenzene	1U	ug/l						
Isopropylbenzene (Cum+)	1U	ug/l						
P-Isopropyltoluene	1U	ug/l						
Ethylbenzene	1U	ug/l						
BENZENE, ETHENYL-(STYR+)	1U	ug/l						
BENZENE, PROPYL-	1U	ug/l						
Butylbenzene	1U	ug/l						
4-Chlorotoluene	1U	ug/l						
1,4-Dichlorobenzene (EDB)	1U	ug/l						
1,2-Dibromoethane	1U	ug/l						
4-Methyl-1-2-Pentanone(M+)	1U	ug/l						
1,3,5-Trimethylbenzene	1U	ug/l						

(Sample Complete)

Project: DOE-075Y LAKWOOD/PLAZA CLEANERS

Officer: PZM Account: D3P11

Laboratory: Ecology, Manchester

Sample No: 92 228112 Description: MW-16B

Begin Date: 92/05/28 :

	VOA - PP Scan (GCMS)	Water-Total	Result	Units	VOA - PP Scan (GCMS)	Water-Total	Result	Units
					*** Continued	***		
Carbon Tetrachloride	1U	ug/1	Bromobenzene	1U	ug/1			
Acetone	5UJ	ug/1	Toluene	1U	ug/1			
Chloroform	1U	ug/1	Chlorobenzene	1U	ug/1			
Benzene	1U	ug/1	1,2,4-Trichlorobenzene	1U	ug/1			
1,1,1-Trichloroethane	1U	ug/1	Dibromochloromethane	1U	ug/1			
Bromomethane	1UJ	ug/1	Tetrachloroethene	6 *	ug/1			
Chloromethane	1U	ug/1	Sec-Butylbenzene	1U	ug/1			
Dibromomethane	1U	ug/1	1,3-Dichloropropane	1U	ug/1			
Bromoform	1U	ug/1	Cis-1,2-Dichloroethene	0.8J*	ug/1			
Bromodichloromethane	1U	ug/1	trans-1,2-Dichloroethene+	1U	ug/1			
Chloroethane	1U	ug/1	1,3-Dichlorobenzene	1U	ug/1			
1,1-Dichloroethene	1U	ug/1	1,1-Dichloropropane	1U	ug/1			
Vinyl Chloride	5UJ	ug/1	2,2-Dichloropropane	1U	ug/1			
Methylene Chloride	5U	ug/1	Ethane, 1,1,1,2-Tetrac+	1U	ug/1			
Carbon Disulfide	1U	ug/1	Total Xylenes	1U	ug/1			
Bromoform	1U	ug/1	cis-1,3-Dichloropropene	1U	ug/1			
Bromodichloromethane	1U	ug/1	trans-1,3-Dichloropropene	1U	ug/1			
1,1-Dichloroethene	1U	ug/1	P-Bromofluorobenzene	86	% Recov			
Trichlorofluoromethane	1U	ug/1	D4-1,2-Dichlorobenzene	52	% Recov			
Methane, Dichlorodiflu+	5U	ug/1	d8-Toluene	91	% Recov			
1,2-Dichloropropane	1U	ug/1	d4-1,2-Dichloroethane	95	% Recov			
2-Butanone	5U	ug/1						
1,1,2-Trichloroethane	1U	ug/1						
Ethane, trichloro-	1U	ug/1						
ETHANE, 1,1,2,2-TETRAC+	1U	ug/1						
1,2,3-Trichlorobenzene	1U	ug/1						
Hexachlorobutadiene	1U	ug/1						
Naphthalene	1U	ug/1						
2-Chlorotoluene	1U	ug/1						
1,2-Dichlorobenzene	1U	ug/1						
1,2,4-Trimethylbenzene	1U	ug/1						
1,2-Dibromo-3-chloropr+	5U	ug/1						
1,2,3-Trichloropropane	1U	ug/1						
Tert-Butylbenzene	1U	ug/1						
Isopropylbenzene (Cum+	1U	ug/1						
p-Isopropyltoluene	1U	ug/1						
Ethylibenzene	1U	ug/1						
BENZENE, ETHENYL-(STYR+)	1U	ug/1						
BENZENE, PROPYL-	1U	ug/1						
Butylibenzene	1U	ug/1						
4-Chlorotoluene	1U	ug/1						
1,4-Dichlorobenzene	1U	ug/1						
1,2-Dibromoethane (EDB)	1U	ug/1						
1,2-Dichloroethane	1U	ug/1						
4-Methyl-2-Pentanone(M+	1U	ug/1						
1,3,5-Trimethylbenzene	1U	ug/1						

(Sample Complete)

Source: Well (Test/Observation)

Project: DOE-075Y LAKWOOD/PLAZA CLEANERS

Officer: PZM
Account: D3P11

Laboratory: Ecology, Manchester

Description: MW-20B

Begin Date: 92/05/28 :

	VOA - PP Scan (GCMS)	Water-Total	Result	Units	VOA - PP Scan (GCMS)	Water-Total	Result	Units	VOA - PP Scan (GCMS)	Water-Total	Result	Units
	Result	Units	Result	Units	Result	Units	Result	Units	Result	Units	Result	Units
Carbon Tetrachloride	5UJ	ug/l	Bromobenzene	1U	ug/l	Trichlorofluoromethane	50U	ug/l				
Acetone	0.3J*	ug/l	Toluene	1U	ug/l	Methane, Dichlorodiflu-	250U	ug/l				
Chloroform	0.3J*	ug/l	Chlorobenzene	1U	ug/l	1,2-Dichloropropane	50U	ug/l				
Benzene	1U	ug/l	1,2,4-Trichlorobenzene	1U	ug/l	2-Butanone	250U	ug/l				
1,1,1-Trichloroethane	0.3J*	ug/l	Dibromo-chloromethane	1U	ug/l	1,1,2-Trichloroethane	50U	ug/l				
Bromomethane	1U	ug/l	Tetrachloroethene	940 *	ug/l	Ethane, trichloro-	50U	ug/l				
Chloromethane	1U	ug/l	Sec-Butylbenzene	1U	ug/l	ETHANE, 1,1,2,2-TETRAC+	50U	ug/l				
Dibromomethane	1U	ug/l	1,3-Dichloropropane	1U	ug/l	1,2,3-Trichlorobenzene	50U	ug/l				
Bromo-chloromethane	1U	ug/l	Cis-1,2-Dichloroethene	32 *	ug/l	Hexachlorobutadiene	50U	ug/l				
Chloroethane	1U	ug/l	trans-1,2-Dichloroethene	0.5J*	ug/l	Naphthalene	50U	ug/l				
Vinyl Chloride	1U	ug/l	1,3-Dichlorobenzene	1U	ug/l	2-Chlorotoluene	50U	ug/l				
Methylene Chloride	5U	ug/l	1,1-Dichloropropane	1U	ug/l	1,2-Dichlorobenzene	50U	ug/l				
Carbon Disulfide	5UJ	ug/l	2,2-Dichloropropane	1U	ug/l	1,2,4-Trimethylbenzene	50U	ug/l				
Bromoform	1U	ug/l	2-Hexanone	1U	ug/l	1,2-Dibromo-3-chloropr+	250U	ug/l				
Bromodichloromethane	0.2J*	ug/l	Ethane, 1,1,1,2-Tetrac+	1U	ug/l	1,2,3-Trichloropropane	50U	ug/l				
1,1-Dichloroethane	1U	ug/l	Total Xylenes	1U	ug/l	Tert-Butylbenzene	50U	ug/l				
1,1-Dichloroethene	1U	ug/l	cis-1,3-Dichloropropene	1U	ug/l	Isopropylbenzene (Cume+)	50U	ug/l				
Trichlorofluoromethane	1U	ug/l	trans-1,3-Dichloropropene	1U	ug/l	p-Isopropyltoluene	50U	ug/l				
Methane, Dichlorodiflu+	5U	ug/l	p-Bromofluorobenzene	87 % Recov		Ethylbenzene	50U	ug/l				
1,2-Dichloropropane	1U	ug/l	D4-1,2-Dichlorobenzene	51 % Recov		BENZENE, ETHENYL-(STYR+	50U	ug/l				
2-Butanone	5U	ug/l	d8-Toluene	90 % Recov		BENZENE, PROPYL-	50U	ug/l				
1,1,2-Trichloroethane	1U	ug/l	d4-1,2-Dichloroethane	96 % Recov		Butylbenzene	50U	ug/l				
Ethane, trichloro-	13 *	ug/l				4-Chlorotoluene	50U	ug/l				
ETHANE, 1,1,2,2-TETRAC+	1U	ug/l				1,4-Dichlorobenzene	50U	ug/l				
1,2,3-Trichlorobenzene	1U	ug/l				1,2-Dibromoethane (EDB)	50U	ug/l				
Hexachlorobutadiene	1U	ug/l				1,2-Dichloroethane	50U	ug/l				
Naphthalene	1U	ug/l				4-Methyl-2-Pentranone (M+	50U	ug/l				
2-Chlorotoluene	1U	ug/l				1,3,5-Trimethylbenzene	50U	ug/l				
1,2,4-Trimethylbenzene	1U	ug/l				Bromobenzene	50U	ug/l				
1,2-Dibromo-3-chloropr+	5U	ug/l				Toluene	50U	ug/l				
1,2,3-Trichloropropane	1U	ug/l				Carbon Tetrachloride	250UJ	ug/l				
Tert-Butylbenzene	1U	ug/l				Acetone	50U	ug/l				
Isopropyltoluene	1U	ug/l				Chloroform	50U	ug/l				
Ethylbenzene	1U	ug/l				Benzene	50U	ug/l				
BENZENE, ETHENYL-(STYR+	1U	ug/l				1,1,1-Trichloroethane	50U	ug/l				
BENZENE, PROPYL-	1U	ug/l				Bromomethane	50U	ug/l				
Butylbenzene	1U	ug/l				Chloromethane	50UJ	ug/l				
4-Chlorotoluene	1U	ug/l				Dibromomethane	50U	ug/l				
1,4-Dichlorobenzene	1U	ug/l				Carbon Disulfide	50U	ug/l				
1,2-Dibromoethane (EDB)	1U	ug/l				Bromoform	50U	ug/l				
1,2-Dichloroethane	1U	ug/l				1,1-Dichloroethane	50U	ug/l				
4-Methyl-2-Pentanone (M+	1U	ug/l				1,1-Dichloroethene	50U	ug/l				
1,3,5-Trimethylbenzene	1U	ug/l				Vinyl Chloride	50U	ug/l				
						Methylene Chloride	250U	ug/l				
						Tetrachloroethene	250UJ	ug/l				
						Sec-Butylbenzene	50U	ug/l				
						1,3-Dichloropropane	50U	ug/l				
						Cis-1,2-Dichloroethene	50U	ug/l				
						trans-1,2-Dichloroethene	50U	ug/l				
						1,3-Dichloroethane	50U	ug/l				
							940 *	ug/l				

(Continued on next page)

Source: Well (Test/Observation)

31-JUL-92
07:56:36

Washington State Department of Ecology
Sample/Project Analysis Results

Project: DOE-075Y LAKEWOOD/PLAZA CLEANERS

Laboratory: Ecology, Manchester

Sample No: 92 228113 Description: MW-20B

Begin Date: 92/05/28 :

+-----	VOA - PP Scan (GCMS)	Water-Total	------
	*** Continued ***		------
Duplicate #1	Result	Units	
+	cis-1,3-Dichloropropene	50U	ug/l
	trans-1,3-Dichloroprop+	50U	ug/l
	P-Bromofluorobenzene	87	% Recov
	D4-1,2-Dichlorobenzene	54	% Recov
	d8-Toluene	94	% Recov
	d4-1,2-Dichloroethane	100	% Recov

Officer: PZM Account: D3P11

Source: Well (Test/Observation)

(Sample Complete)

Washington State Department of Ecology
Sample/Project Analysis Results

31-JUL-92
07:56:36

Project: DOE-075Y LAKEWOOD/PLAZA CLEANERS

Laboratory: Ecology, Manchester

Sample No: 92 228114 Description: MW-20A**

Begin Date: 92/05/28 :

	VOA - PP Scan (GCMS)	Water-Total	Result	Units	VOA - PP Scan (GCMS)	Water-Total	Result	Units	VOA - PP Scan (GCMS)	Water-Total	Result	Units	VOA - PP Scan (GCMS)	Water-Total	Result	Units
					***	Continued	***		***	Continued	***		Matrix Spike #1	Result	Units	
Carbon Tetrachloride	1U	ug/1	Bromobenzene	1U	ug/1	Trichlorofluoromethane	96	% Recov	Methane, Dichlorodiflu+	98	% Recov					
Acetone	5UJ	ug/1	Toluene	1U	ug/1	1,2-Dichloropropane	116	% Recov	2-Butanone	122	% Recov					
Chloroform	1U	ug/1	Chlorobenzene	1U	ug/1	1,1,2-Trichloroethane	100	% Recov	Tetrachloroethene	100	% Recov					
Benzene	1U	ug/1	1,2,4-Trichlorobenzene	1U	ug/1	Ethene, trichloro-	100	% Recov	Dibromoethane	100	% Recov					
			Dibromochloromethane	1U	ug/1	ETHANE, 1,1,2,2-TETRAC+	96	% Recov	Sec-Butylbenzene	1U	ug/1	1,2,3-Trichlorobenzene	104	% Recov		
1,1,1-Trichloroethane	1U	ug/1	1,2-Dichloropropane	1U	ug/1	Hexachlorobutadiene	115	% Recov	Cis-1,2-Dichloroethene	1U	ug/1	Naphthalene	106	% Recov		
Bromomethane	1U	ug/1	trans-1,2-Dichloroethene+	1U	ug/1	2-Chlorotoluene	98	% Recov	Dibromomethane	1U	ug/1	1,2-Dichlorobenzene	104	% Recov		
Chloromethane	1U	ug/1	1,3-Dichlorobenzene	1U	ug/1	1,2,4-Trimethylbenzene	98	% Recov	Bromoform	1U	ug/1	2,2-Hexanone	89	% Recov		
Dibromomethane	1U	ug/1	1,1-Dichloropropane	1U	ug/1	1,2,3-Chloropropene	100	% Recov	Bromochloromethane	1U	ug/1	Ethane, 1,1,1,2-Tetrac+	100	% Recov		
Bromochloromethane	1U	ug/1	2,2-Dichloropropane	1U	ug/1	Total Xylenes	96	% Recov	1,1-Dichloroethane	1U	ug/1	cis-1,3-Dichloropropene	108	% Recov		
Chloroethane	1U	ug/1	2-Hexanone	1U	ug/1	p-Isopropyltoluene	94	% Recov	1,1-Dichloroethene	1U	ug/1	trans-1,3-Dichloroprop+	99	% Recov		
Vinyl Chloride	1U	ug/1	Ethane, 1,1,1,2-Tetrac+	1U	ug/1	p-Bromofluorobenzene	92	% Recov	1,2-Dibromopropane	1U	ug/1	D4-1,2-Dichlorobenzene	92	% Recov		
Methylene Chloride	1U	ug/1	Total Xylenes	1U	ug/1	D4-1,2-Dichlorobenzene	92	% Recov	d8-Toluene	1U	ug/1	d8-Toluene	116	% Recov		
Carbon Disulfide	5UJ	ug/1	cis-1,3-Dichloropropene	1U	ug/1	ETHENE, PROPYL-	97	% Recov	1,2-Dichloroethane	1U	ug/1	d4-1,2-Dichloroethane	97	% Recov		
Bromoform	1U	ug/1	2,2-Dichloropropane	1U	ug/1	Butylbenzene	97	% Recov	4-Chlorotoluene	1U	ug/1	4-Chlorotoluene	102	% Recov		
Bromodichloromethane	1U	ug/1	2-Hexanone	1U	ug/1	1,4-Dichlorobenzene	103	% Recov	1,1-Dichloroethane	1U	ug/1	1,4-Dichlorobenzene	103	% Recov		
1,1-Dichloroethane	1U	ug/1	Ethane, 1,1,1,2-Tetrac+	1U	ug/1	1,2-Dibromoethane (EDB)	102	% Recov	1,1-Dichloroethene	1U	ug/1	1,2-Dibromoethane	102	% Recov		
1,1-Dichloroethene	1U	ug/1	Total Xylenes	1U	ug/1	Tert-Butylbenzene	96	% Recov	Trichloroethene	1U	ug/1	cis-1,3-Dichloropropene	108	% Recov		
Trichlorofluoromethane	1U	ug/1	cis-1,3-Dichloropropene	1U	ug/1	p-Isopropylbenzene	94	% Recov	1,2,3-Chloropropene	1U	ug/1	trans-1,3-Dichloroprop+	99	% Recov		
Methane, Dichlorodiflu+	1U	ug/1	1,2,4-Trichloroethene	1U	ug/1	Ethylenbenzene	99	% Recov	1,2,3-Chloropropene	1U	ug/1	p-Bromofluorobenzene	99	% Recov		
1,2-Dichloropropane	1U	ug/1	1,2-Dibromopropane	1U	ug/1	BENZENE, ETHENYL-(STYR+	92	% Recov	1,2-Dibromopropane	1U	ug/1	D4-1,2-Dichlorobenzene	92	% Recov		
2-Butanone	5U	ug/1	d8-Toluene	1U	ug/1	BENZENE, PROPYL-	116	% Recov	1,2-Dichloroethene	1U	ug/1	d4-1,2-Dichloroethane	116	% Recov		
1,1,2-Trichloroethane	1U	ug/1	1,2-Dichloroethane	1U	ug/1	Butylbenzene	97	% Recov	4-Chlorotoluene	1U	ug/1	4-Chlorotoluene	97	% Recov		
Ethene, trichloro-	1U	ug/1	1,2,3-Trichloroethane	1U	ug/1	Carbon Tetrachloride	94	% Recov	1,2,4-Trichloroethene	103	% Recov					
ETHANE, 1,1,2,2-TETRAC+	1U	ug/1	Acetone	62J	% Recov	1,2-Dichloroethane	98	% Recov	Dibromochloromethane	103	% Recov					
1,2,3-Trichlorobenzene	1U	ug/1	Chloroform	98	% Recov	1,2,4-Trichloroethene	98	% Recov	Bromobenzene	100	% Recov					
1,2,4-Trichlorobenzene	1U	ug/1	Benzene	99	% Recov	1,3,5-Trichlorobutane	98	% Recov	Toluene	96	% Recov					
1,2-Dibromo-3-chloropr+	5U	ug/1	1,1,1-Trichloroethane	96	% Recov	1-Methyl-2-Pentanone (M+	96	% Recov	Chlorobenzene	98	% Recov					
1,2,3-Trichloropropane	1U	ug/1	Bromomethane	108	% Recov	1,3,5-Trichlorobutane	103	% Recov	1,2,4-Trichloroethene	103	% Recov					
2-Chlorotoluene	1U	ug/1	Chloromethane	107	% Recov	Bromobenzene	100	% Recov	Dibromochloromethane	102	% Recov					
1,2-Dichlorobutadiene	1U	ug/1	Ethylbenzene	114	% Recov	Sec-Butylbenzene	106	% Recov	Tetrachloroethene	97	% Recov					
Hexachlorobutadiene	1U	ug/1	1,1,1-Trichloroethane	97	% Recov	1,3-Dichloropropane	99	% Recov	1,3-Dichloropropane	99	% Recov					
Naphthalene	1U	ug/1	Bromomethane	108	% Recov	Cis-1,2-Dichloroethene	103	% Recov	1,2-Dichloroethene	103	% Recov					
2-Chlorotoluene	1U	ug/1	Chloromethane	107	% Recov	1,2-Dichloroethene	102	% Recov	Dibromochloromethane	100	% Recov					
1,2,4-Trichlorobenzene	1U	ug/1	Ethylbenzene	114	% Recov	1,3-Dichloropropane	99	% Recov	1,3-Dichloropropane	99	% Recov					
1,2-Dibromo-3-chloropr+	5U	ug/1	BENZENE, ETHENYL-(STYR+	100	% Recov	Cis-1,2-Dichloroethene	103	% Recov	1,2-Dichloroethene	103	% Recov					
1,2,3-Trichloropropane	1U	ug/1	Isopropylbenzene	84	% Recov	trans-1,2-Dichloroethene	102	% Recov	1,2-Dichloroethene	102	% Recov					
2-Chlorotoluene	1U	ug/1	P-Isopropyltoluene	100	% Recov	1,3-Dichloropropane	100	% Recov	1,3-Dichloropropane	100	% Recov					
1,2-Dibromoethene	1U	ug/1	Ethylenbenzene	96	% Recov	Cis-1,2-Dichloroethene	104	% Recov	1,2-Dichloroethene	104	% Recov					
1,2-Dibromoethane (EDB)	1U	ug/1	BENZENE, PROPYL-	104	% Recov	trans-1,2-Dichloroethene	102	% Recov	1,2-Dichloroethene	102	% Recov					
Ethylbenzene	1U	ug/1	1,4-Dichlorobenzene	97	% Recov	1,3-Dichloropropane	106	% Recov	1,3-Dichloropropane	106	% Recov					
1,2-Dibromoethane	1U	ug/1	1,2-Dibromoethane	104	% Recov	2,2-Dichloropropane	100	% Recov	2,2-Dichloropropane	100	% Recov					
1,2-Dibromoethane	1U	ug/1	1,1,1-Trichloroethane	93	% Recov	2-Hexanone	124	% Recov	2-Hexanone	124	% Recov					
1,2-Dibromoethane	1U	ug/1	1,1,1,2-Tetrac+	104	% Recov	Ethane, 1,1,1,2-Tetrac+	92	% Recov	Ethane, 1,1,1,2-Tetrac+	92	% Recov					
4-Chlorotoluene	1U	ug/1	1,1-Dichloroethene	1U	ug/1	Total Xylenes	93	% Recov	Total Xylenes	93	% Recov					

(Continued on next page)

Officer: PZM Account: D3P11

Project: DOE-075Y LAKEWOOD/PLAZA CLEANERS

Laboratory: Ecology, Manchester

Sample No: 92 228114 Description: MW-20A**

Begin Date: 92/05/28 :

	VOA - PP Scan (GCMS)	Water-Total	VOA - PP Scan (GCMS)	Water-Total
	Matrix Spike #1	Result	Matrix Spike #2	Result
	Result	Units	Result	Units
D4-1,2-Dichlorobenzene	56	% Recov	Isopropylbenzene (Cume+ P-Isopropyltoluene	103 % Recov
d8-Toluene	98	% Recov	Ethylbenzene	96 % Recov
cis-1,3-Dichloropropene	47	% Recov	BENZENE, ETHENYL-(STYR+	94 % Recov
trans-1,3-Dichloropropene	48	% Recov	BENZENE, PROPYL-	92 % Recov
d4-1,2-Dichloroethane	107	% Recov	Butylbenzene	104 % Recov
p-Bromofluorobenzene	97	% Recov	4-Chlorotoluene	98 % Recov
Acetone	59J	% Recov	1,4-Dichlorobenzene	100 % Recov
Chloroform	96	% Recov	1,2-Dibromoethane (EDB)	99 % Recov
Benzene	103	% Recov	1,2-Dichloroethane	98 % Recov
1,1,1-Trichloroethane	96	% Recov	4-Methyl-2-Pentanone(M+	104 % Recov
Bromomethane	102	% Recov	1,3,5-Trimethylbenzene	98 % Recov
Chloromethane	102	% Recov	Bromobenzene	104 % Recov
Dibromomethane	98	% Recov	Toluene	97 % Recov
Bromoethylmethane	97	% Recov	Chlorobenzene	98 % Recov
Chloroethane	96	% Recov	1,2,4-Trichlorobenzene	100 % Recov
Vinyl Chloride	96	% Recov	Dibromochloromethane	90 % Recov
Methylene Chloride	91	% Recov	Tetrachloroethene	99 % Recov
Carbon Disulfide	78J	% Recov	Sec-Butylbenzene	104 % Recov
Bromoform	98	% Recov	1,3-Dichloropropane	100 % Recov
Bromodichloromethane	88	% Recov	Cis-1,2-Dichloroethene	96 % Recov
1,1-Dichloroethane	96	% Recov	trans-1,2-Dichloroethene+	98 % Recov
1,1-Dichloroethene	97	% Recov	1,3-Dichlorobenzene	103 % Recov
Trichlorofluoromethane	92	% Recov	1,1-Dichloropropane	98 % Recov
Methane, Dichlorodiflu-	124	% Recov	2,2-Dichloropropane	100 % Recov
1,2-Dichloropropane	107	% Recov	2-Hexanone	117 % Recov
2-Butanone	112	% Recov	Ethane, 1,1,1,2-Tetrac-	96 % Recov
1,1,2-Trichloroethane	104	% Recov	Total Xylenes	112 % Recov
Ethene, trichloro-	98	% Recov	D4-1,2-Dichlorobenzene	53 % Recov
ETHANE, 1,1,2,2-TETRAC+	98	% Recov	d8-Toluene	96 % Recov
1,2,3-Trichlorobenzene	100	% Recov	cis-1,3-Dichloropropene	49 % Recov
Hexachlorobutadiene	98	% Recov	trans-1,3-Dichloropropene	42 % Recov
Naphthalene	105	% Recov	d4-1,2-Dichloroethane	105 % Recov
2-Chlorotoluene	97	% Recov	p-Bromofluorobenzene	94 % Recov
1,2-Dichlorobenzene	108	% Recov		
1,2,4-Trimethylbenzene	104	% Recov		
1,2,4-Tribromo-3-chloropr+	133	% Recov		
1,2,3-Trichloropropane	102	% Recov		
Tert-Butylbenzenes	105	% Recov		

(Sample Complete)

Source: Well (Test/Observation)

Officer: PZM

Account: D3P11

Project: DOE-075Y LAKEWOOD/PLAZA CLEANERS

Laboratory: Ecology, Manchester

Sample No: 92 228115

Description: TRANSFER

Begin Date: 92/05/28 :

	VOA - PPP Scan (GCMS)	Water-Totals	Result	Units	VOA - PP Scan (GCMS)	Water-Totals	Result	Units
		Result	Units		**	Continued	**	
Carbon Tetrachloride	1U	ug/1		Bromobenzene		1U	ug/1	
Acetone	2UJ	ug/1		Toluene		1U	ug/1	
Chloroform	1U	ug/1		Chlorobenzene		1U	ug/1	
Benzene	1U	ug/1		1,2,4-Trichlorobenzene		1U	ug/1	
1,1,1-Trichloroethane	1U	ug/1		Dibromochloromethane		1U	ug/1	
Bromomethane	1UJ	ug/1		Tetrachloroethene		1U	ug/1	
Chloromethane	1U	ug/1		Sec-Butylbenzene		1U	ug/1	
Dibromomethane	1U	ug/1		1,3-Dichloropropane		1U	ug/1	
Bromoform	1U	ug/1		Cis-1,2-Dichloroethene		1U	ug/1	
Bromodichloromethane	1U	ug/1		trans-1,2-Dichloroethene+		1U	ug/1	
Chloroethane	1U	ug/1		1,3-Dichlorobenzene		1U	ug/1	
Vinyl Chloride	1U	ug/1		1,1-Dichloropropane		1U	ug/1	
Methylene Chloride	1U	ug/1		2,2-Dichloropropane		1U	ug/1	
Carbon Disulfide	5UJ	ug/1		2-Hexanone		1U	ug/1	
Bromoform	1U	ug/1		Ethane, 1,1,1,2-Tetrac+		1U	ug/1	
Bromodichloromethane	1U	ug/1		Total Xylenes		1U	ug/1	
1,1-Dichloroethane	1U	ug/1		cis-1,3-Dichloropropene		1U	ug/1	
1,1-Dichlorofluoromethane	1U	ug/1		trans-1,3-Dichloroprop+		1U	ug/1	
Trichlorofluoromethane	1U	ug/1		p-Bromofluorobenzene		89	% Recov	
Methane, Dichlorodiflu+	5U	ug/1		D4-1,2-Dichlorobenzene		51	% Recov	
1,2-Dichloropropane	1U	ug/1		d8-Toluene		90	% Recov	
2-Butanone	1U	ug/1		d4-1,2-Dichloroethane		100	% Recov	
1,1,2-Trichloroethane	1U	ug/1						
Ethene, trichloro-	1U	ug/1						
ETHANE, 1,1,2,2-TETRAC+	1U	ug/1						
1,2,3-Trichlorobenzene	1U	ug/1						
Hexachlorobutadiene	1U	ug/1						
Naphthalene	1U	ug/1						
2-Chlorotoluene	1U	ug/1						
1,2-Dichlorobenzene	1U	ug/1						
1,2,4-Trimethylbenzene	1U	ug/1						
1,2-Dibromo-3-chloropr+	5U	ug/1						
1,2,3-Trichloropropane	1U	ug/1						
Tert-Butylbenzene	1U	ug/1						
Isopropylbenzene (Cum+	1U	ug/1						
Ethylbenzene	1U	ug/1						
BENZENE, ETHENYL-(STYR+	1U	ug/1						
BENZENE, PROPYL-	1U	ug/1						
Butylbenzene	1U	ug/1						
4-Chlorotoluene	1U	ug/1						
1,4-Dichlorobenzene	1U	ug/1						
1,2-Dibromoethane (EDB)	1U	ug/1						
1,2-Dichloroethane	1U	ug/1						
4-Methyl-1-2-Pentanone(M+	1U	ug/1						
1,3,5-Trimethylbenzene	1U	ug/1						

(Sample Complete)

Account: D3P11

Officer: PZM

Source: Water (General)

Project: DOE-075Y LAKWOOD/PLAZA CLEANERS

Laboratory: Ecology, Manchester

Sample No: 92 228116 Description: TRANSPOR

Begin Date: 92/05/28 :

	VOA - PP Scan (GCMS)	Water-Total	Result	Units	VOA - PP Scan (GCMS)	Water-Total	Result	Units
Carbon Tetrachloride	1U	ug/1	Bromobenzene	1U	ug/1			
Acetone	5UJ	ug/1	Toluene	1U	ug/1			
Chloroform	1U	ug/1	Chlorobenzene	1U	ug/1			
Benzene	1U	ug/1	1,2,4-Trichlorobenzene	1U	ug/1			
1,1,1-Trichloroethane	1U	ug/1	Dibromochloromethane	1U	ug/1			
Bromomethane	1UJ	ug/1	Tetrachloroethene	1U	ug/1			
Chloromethane	1UJ	ug/1	Sec-Butylbenzene	1U	ug/1			
Dibromomethane	1U	ug/1	1,3-Dichloropropane	1U	ug/1			
Bromoform	1U	ug/1	Cis-1,2-Dichloroethene	1U	ug/1			
Bromodichloromethane	1U	ug/1	trans-1,2-Dichloroethene+	1U	ug/1			
1,1-Dichloroethane	1U	ug/1	1,3-Dichlorobenzene	1U	ug/1			
1,1-Dichloroethene	1U	ug/1	1,1-Dichloropropene	1U	ug/1			
Trichlorofluoromethane	5UJ	ug/1	2,2-Dichloropropane	1U	ug/1			
Methane, Dichlorodiflu+	5U	ug/1	2-Hexanone	1U	ug/1			
1,2-Dichloropropane	1U	ug/1	Ethane, 1,1,1,2-Tetrac+	1U	ug/1			
2-Butanone	5U	ug/1	Total Xylenes	1U	ug/1			
1,1,2-Trichloroethane	1U	ug/1	cis-1,3-Dichloropropene	1U	ug/1			
Ethene, trichloro-	1U	ug/1	trans-1,3-Dichloropropene	1U	ug/1			
ETHANE, 1,1,2,2-TETRAC+	1U	ug/1	P-Bromofluorobenzene	90	% Recov			
1,2,3-Trichlorobenzene	1U	ug/1	D4-1,2-Dichlorobenzene	55	% Recov			
Hexachlorobutadiene	1U	ug/1	d8-Toluene	93	% Recov			
Naphthalene	1U	ug/1	d4-1,2-Dichloroethane	104	% Recov			
2-Chlorotoluene	1U	ug/1						
1,2,4-Trimethylbenzene	1U	ug/1						
1,2-Dibromo-3-chloropr+	5U	ug/1						
1,2,3-Trichloropropane	1U	ug/1						
Tert-Butylbenzene	1U	ug/1						
Isopropyltoluene (Cum+	1U	ug/1						
Ethylbenzene	1U	ug/1						
BENZENE, ETHENYL-(STYR+)	1U	ug/1						
BENZENE, PROPYL-	1U	ug/1						
Butylbenzene	1U	ug/1						
4-Chlorotoluene	1U	ug/1						
1,4-Dichlorobenzene	1U	ug/1						
1,2-Dibromoethane (EDB)	1U	ug/1						
1,2-Dichloroethane	1U	ug/1						
4-Methyl-2-Pentanone (M+	1U	ug/1						
1,3,5-Trimethylbenzene	1U	ug/1						

(Sample Complete)

Source: Water (General)

Officer: PZM

Account: D3P11

Project: DOE-075Y LAKWOOD/PLAZA CLEANERS

Blank ID: BW2156

Page 15
Officer: PZM Account: D3P11

	VOA - PP Scan (GCMS)	Water-Total	VOA - PP Scan (GCMS)	Water-Total	
Blank #1	Result	Units	Blank #1	Result	Units
Carbon Tetrachloride	1U	ug/1			
Acetone	5J*	ug/1	Bromobenzene	1U	ug/1
Chloroform	1U	ug/1	Toluene	1U	ug/1
Benzene	1U	ug/1	Chlorobenzene	1U	ug/1
1,1,1-Trichloroethane	1U	ug/1	1,2,4-Trichlorobenzenes	1U	ug/1
Bromomethane	1U	ug/1	Dibromo-chloromethane	1U	ug/1
Bromochloromethane	1U	ug/1	Tetrachloroethene	1U	ug/1
Chloromethane	1U	ug/1	Sec-Butylbenzene	1U	ug/1
Dibromomethane	1U	ug/1	1,3-Dichloropropane	1U	ug/1
Bromoform	1U	ug/1	Cis-1,2-Dichloroethene	1U	ug/1
Chloroethane	1U	ug/1	trans-1,2-Dichloroethene	1U	ug/1
Vinyl Chloride	1U	ug/1	1,3-Dichlorobenzene	1U	ug/1
Methylene Chloride	0.5U*	ug/1	1,1-Dichloropropane	1U	ug/1
Carbon Disulfide	1U	ug/1	2,2-Dichloropropane	1U	ug/1
Bromodichloromethane	1U	ug/1	2-Hexanone	1U	ug/1
1,1-Dichloroethane	1U	ug/1	Ethane, 1,1,1,2-Tetrachloroethene	1U	ug/1
1,1-Dichloroethene	1U	ug/1	Total Xylenes	1U	ug/1
Trichlorofluoromethane	1U	ug/1	cis-1,3-Dichloropropene	1U	ug/1
Methane, Dichlorodifluoromethane	5U	ug/1	trans-1,3-Dichloropropene	1U	ug/1
1,2-Dichloropropane	1U	ug/1	P-Bromofluorobenzene	98	% Recov
2-Butanone	2J*	ug/1	D4-1,2-Dichlorobenzene	52	% Recov
1,1,2-Trichloroethane	1U	ug/1	d8-Toluene	100	% Recov
Ethene, trichloro-Ethane,	1U	ug/1	d4-1,2-Dichloroethane	100	% Recov
1,1,2,2-TETRAC+	1U	ug/1			
1,2,3-Trichlorobenzene	1U	ug/1			
Hexachlorobutadiene	1U	ug/1			
Naphthalene	1U	ug/1			
2-Chlorotoluene	1U	ug/1			
1,2-Dichlorobenzene	1U	ug/1			
1,2,4-Trimethylbenzene	1U	ug/1			
1,2-Dibromo-3-chloropropane	5U	ug/1			
1,2,3-Trichloropropane	1U	ug/1			
Tert-Butylbenzene	1U	ug/1			
Isopropylbenzene (Cumene)	1U	ug/1			
P-Isopropyltoluene	1U	ug/1			
Ethylbenzene	1U	ug/1			
BENZENE, ETHENYL-(STYR+)	1U	ug/1			
BENZENE, PROPYL-	1U	ug/1			
Butylbenzene	1U	ug/1			
4-Chlorotoluene	1U	ug/1			
1,4-Dichlorobenzene	1U	ug/1			
1,2-Dibromoethane (EDB)	1U	ug/1			
1,2-Dichloroethane	1U	ug/1			
4-Methyl-2-Pentanone (M+)	1U	ug/1			
1,3,5-Trimethylbenzene	1U	ug/1			

(Sample Complete)

Project: DOE-075Y LAKWOOD/PLAZA CLEANERS

Blank ID: BW2157

Officer: PZM

Account: D3P11

	VOA - PP Scan (GCMS)	Water-Totals	VOA - PP Scan (GCMS)	Water-Totals
	Blank #2	Result Units	Blank #2	Result Units
Carbon Tetrachloride	1U	ug/1	1U	ug/1
Acetone	5U*	ug/1	Bromobenzene	1U ug/1
Chloroform	1U	ug/1	Toluene	0.1U* ug/1
Benzene	1U	ug/1	Chlorobenzene	1U ug/1
1,1,1-Trichloroethane	1U	ug/1	1,2,4-Trichlorobenzene	1U ug/1
Bromomethane	1U	ug/1	Dibromochloromethane	1U ug/1
Chloromethane	1U	ug/1	Tetrachloroethene	1U ug/1
Dibromomethane	1U	ug/1	Sec-Butylbenzene	1U ug/1
Bromoethylmethane	1U	ug/1	1,3-Dichloropropane	1U ug/1
Chloroethane	1U	ug/1	Cis-1,2-Dichloroethene	1U ug/1
Vinyl Chloride	1U	ug/1	trans-1,2-Dichloroethene	1U ug/1
Methylene Chloride	0.3U*	ug/1	1,3-Dichlorobenzene	1U ug/1
Carbon Disulfide	5U	ug/1	1,1-Dichloropropane	1U ug/1
Bromoform	1U	ug/1	2,2-Dichloropropane	1U ug/1
Bromodichloromethane	1U	ug/1	2-Hexanone	1U ug/1
1,1-Dichloroethane	1U	ug/1	Ethane, 1,1,1,2-Tetrac+	1U ug/1
1,1-Dichloroethene	1U	ug/1	Total Xylenes	1U ug/1
Trichlorofluoromethane	1U	ug/1	cis-1,3-Dichloropropene	1U ug/1
Methane, Dichlorodiflu+	5U	ug/1	trans-1,3-Dichloroprop-	1U ug/1
1,2-Dichloropropane	1U	ug/1	P-Bromofluorobenzene	87 % Recov
2-Butanone	2.2U*	ug/1	D4-1,2-Dichlorobenzene	52 % Recov
1,1,2-Trichloroethane	1U	ug/1	d8-Toluene	92 % Recov
Ethene, trichloro-	1U	ug/1	d4-1,2-Dichloroethane	98 % Recov
ETHANE, 1,1,2,2-TETRAC+	1U	ug/1		
1,2,3-Trichlorobenzene	1U	ug/1		
Hexachlorobutadiene	1U	ug/1		
Naphthalene	1U	ug/1		
2-Chlorotoluene	1U	ug/1		
1,2-Dichlorobenzene	1U	ug/1		
1,2,4-Trimethylbenzene	1U	ug/1		
1,2-Dibromo-3-chloropr+	5U	ug/1		
1,2,3-Trichloropropane	1U	ug/1		
Tert-Butylbenzene	1U	ug/1		
Isopropylbenzene (Cumene)	1U	ug/1		
p-Isopropyltoluene	1U	ug/1		
Ethylbenzene	1U	ug/1		
BENZENE, ETHENYL-(STYR+	1U	ug/1		
BENZENE, PROPYL-	1U	ug/1		
Butylbenzene	1U	ug/1		
4-Chlorotoluene	1U	ug/1		
1,4-Dichlorobenzene	1U	ug/1		
1,2-Dibromoethane (EDB)	1U	ug/1		
1,2-Dichloroethane	1U	ug/1		
4-Methyl-2-Pentanone(M+	1U	ug/1		
1,3,5-Trimethylbenzene	1U	ug/1		

(Sample Complete)

Project: DOE-075Y LAKWOOD/PLAZA CLEANERS

Blank ID: BW2160

Officer: PZM Account: D3P11

	VOA - PP Scan (GCMS)	Water-Total	VOA - PP Scan (GCMS)	Water-Total
	Blank #3	Result Units	Blank #3	Result Units ***
Carbon Tetrachloride	1U	ug/l	1U	ug/l
Acetone	5J*	ug/l		
Chloroform	1U	ug/l	Toluene	1U ug/l
Benzene	1U	ug/l	Chlorobenzene	1U ug/l
1,1-Trichloroethane	1U	ug/l	1,2,4-Trichlorobenzene	1U ug/l
Bromomethane	1U	ug/l	Dibromochloromethane	1U ug/l
Chloromethane	1U	ug/l	Tetrachloroethane	1U ug/l
Dibromomethane	1U	ug/l	Sec-Butylbenzene	1U ug/l
Bromoform	1U	ug/l	1,3-Dichloropropane	1U ug/l
Chloroethane	1U	ug/l	Cis-1,2-Dichloroethene	1U ug/l
Vinyl Chloride	1U	ug/l	trans-1,2-Dichloroethene	1U ug/l
Methylene Chloride	0.4J*	ug/l	1,3-Dichlorobenzene	1U ug/l
Carbon Disulfide	5U	ug/l	1,1-Dichloropropene	1U ug/l
Bromoform	1U	ug/l	2,2-Dichloropropane	1U ug/l
Bromodichloromethane	1U	ug/l	2-Hexanone	1U ug/l
1,1-Dichloroethane	1U	ug/l	Ethane, 1,1,1,2-Tetrac+	1U ug/l
1,1-Dichloroethene	1U	ug/l	Total Xylenes	1U ug/l
Trichlorofluoromethane	1U	ug/l	cis-1,3-Dichloropropene	1U ug/l
Methane, Dichlorodiflu+	5U	ug/l	trans-1,3-Dichloroprop	1U ug/l
1,2-Dichloropropane	1U	ug/l	P-Bromofluorobenzene	93 % Recov
2-Butanone	2J*	ug/l	D4-1,2-Dichlorobenzene	55 % Recov
1,1,2-Trichloroethane	1U	ug/l	d8-Toluene	104 % Recov
Ethene, trichloro-	1U	ug/l	d4-1,2-Dichloroethane	108 % Recov
ETHANE, 1,1,2,2-TETRAC+	1U	ug/l		
1,2,3-Trichlorobenzene	1U	ug/l		
Hexachlorobutadiene	1U	ug/l		
Naphthalene	1U	ug/l		
2-Chlorotoluene	1U	ug/l		
1,2-Dichlorobenzene	1U	ug/l		
1,2-Dibromo-3-chloropr+	5U	ug/l		
1,2,3-Trichloropropane	1U	ug/l		
Tert-Butylbenzene	1U	ug/l		
Isopropylbenzene (Cumene)	1U	ug/l		
P-Isopropyltoluene	1U	ug/l		
Ethylbenzene	1U	ug/l		
BENZENE, ETHENYL-(STYR+)	1U	ug/l		
BENZENE, PROPYL-	1U	ug/l		
Butylbenzene	1U	ug/l		
4-Chlorotoluene	1U	ug/l		
1,4-Dichlorobenzene	1U	ug/l		
1,2-Dibromoethane (EDB)	1U	ug/l		
1,2-Dichloroethane	1U	ug/l		
4-Methyl-1-2-Pentanone(M+)	1U	ug/l		
1,3,5-Trimethylbenzene	1U	ug/l		
			Tent Ident - VOA Sca	Water-Total
			Blank #1	Result Units
				1.3NJ* ug/l
			HEXANE, 2,2-DIMETHYL-	

(Sample Complete)

APPENDIX B

Historical TCE and PERC Data

Table B-1
TCE Concentrations Measured in Monitoring Wells
Fonda's Corner, Washington

Table B-1
TCE Concentrations Measured in Monitoring Wells
Pender's Corner, Washington

Executive Summary

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Duplicate analysis. Detection limit = 100 $\mu\text{g/l}$.
The detection limit is based on the specified detection limit of 100 $\mu\text{g/l}$.

Estimated value. Compound present
as Wells constructed 287 through 387.

Note: Units in metric billions

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NM = Not measured.
ND = Not detected.

D = Detected, not quantified.

J = Estimated value Value not accurate

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Note: Units in parts per billion.

Table B-2
PERC Concentrations Measured in Monitoring Wells
Ponders Corner, Washington

Well No.	2/17/85		3/18/85		5/16/85		6/17/85		8/20/85		8/25/85		10/5/85		12/16/86		3/17/87		10/5/87		1/24/88		4/7/88		4/23/89	
	Through	Through	Through	Through	Through	Through	Through	Through	Through	Through	Through	Through														
33	ND	ND	NM	NM	ND	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM							
34	83	NM	NM	NM	NM	1.2	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM								
35	ND	ND	NM	NM	ND	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM							
36	139	NM	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	D	ND										
37 ^d													ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
38 ^d													ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
39A ^d													ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
39B ^d													ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
39C													ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
40 ^d													ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
41 ^d													ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

^aExceeded acceptable holding time.

^bDuplicate analysis.

^cEstimated value. Compound present but at less than the specified detection limit.

^dWells constructed 2/87 through 3/87.

Notes:

NM = Not measured.

ND = Not detected.

D = Detected, not quantified.

J = Estimated value. Value not accurate.

Table B-2
PERC Concentrations Measured in Monitoring Wells
Penders Corner, Washington